

Suggested Session: Nuclear and Atomic Physics

## Design and Construction of a Prototype Cement Analysis System

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Within the cement industry, like most industries, quality control is an important concern. The elemental composition of the coal has a major impact on its value and ability to burn. However, current techniques used to determine these properties each have flaws that lead to the need for finding a better, more efficient system. A new system currently being developed involves neutron analysis. It would employ a d-d neutron generator. This new system would have several benefits over current systems. It would offer faster analysis time utilizing Pulsed Fast/Thermal Neutron Analysis (PFTNA), as well as a lower safety risk to workers. The proposed system was used to run analysis on a sample of cement to test the hypothesized benefits. From these test runs, the system was found to be able to detect the necessary elements within detection limits, and was more easily shielded. The next step in the process will require building an actual system at a cement plant to find how it will work in practice.